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EXAMINER

FAULK, DEVONA E

ART UNIT	PAPER NUMBER
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2644

DATE MAILED: 12/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/534,682	Applicant(s) WATTS, LLOYD	
	Examiner Devona E. Faulk	Art Unit 2644	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 July 2004.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-12,14-20 and 22 is/are pending in the application.
4a) Of the above claim(s) 2,13 and 21 is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☐ Claim(s) _____ is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1,3-12, 14-20, and 22 have been considered but are moot in view of the new ground(s) of rejection.
2. Claims 2, 13 and 21 have been cancelled.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. **Claims 1,3,4,12 and 14** are rejected under 35 U.S.C. 102(b) as being anticipated by Williamson et al. (U.S. Patent 5,027,410).

Regarding **claim 1**, Williamson discloses a system for processing audio signals (Figure 8; column 13, lines 32-53) comprising a sequence of digital filter configured to process sound similar to a cochlea (131-135, Figure 8), wherein each filter is configured to process a selected frequency that is progressively higher than a successive filter and at least one filter is configured to process more than one frequency and each filter includes coefficients for processing and the coefficients are used to process more than one frequency wherein the sequence of digital filters processes sound over a plurality of octaves and each octave is processed by a filter group having a plurality of filters (Figure 8, column 13, lines 32-column 14, line 8).

All elements of claim 3 are comprehended by claim 1 (Figure 8).

All elements of claim 4 are comprehended by claim 3 (Figure 8; column 13, lines 32-53).

2. Regarding **claim 12** Williamson discloses a system for processing audio signals (Figure 8; column 13, lines 32-53) comprising a sequence of digital filter configured to process sound similar to a cochlea (131-135, Figure 8) ,wherein each filter includes coefficients for processing and a first filter configured to process a first frequency shares its coefficients with a second filter configured to process a second frequency that is progressively lower than the first frequency, the second frequency is spaced apart from the first frequency by at least one frequency interval, wherein the sequence of digital filters processes sound over a plurality of octaves and each octave is processed by a filter group having a plurality of filters (Figure 8, column 13, lines 32-column 14, line 8).

All elements of claim 14 are comprehended by claim 12.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. **Claims 5-11, 15-20** are rejected under 35 U.S.C. 103(a) as being unpatentable over Williamson et al. (U.S. Patent 5,027,410) in view of Menkhoff et al. (U.S. Patent 6,137,349)

Claim 5 claims the system of claim 4, wherein at least one filter is configured to sample the first frequency at a first sampling rate and the second frequency at a second sampling rate. As stated above apropos of claim 4, Williamson meets all elements of that claim. Menkhoff teaches of a filter combination for sampling rate conversion comprising a time varying filter. The time

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varying filter provides the capability of varying the sampling rate. Modifying Williamson's apparatus so that at least one filter is a time varying one reads on the claimed matter. Thus it would have been obvious to one of ordinary skill in the art at the time of the invention to use Lyon's concept of a time varying filter in Lyon's apparatus for the benefit of achieving spectral translation or sampling rate changes or conversions.

Claim 6 claims the system of claim 5, wherein the second frequency is lower than the first frequency and the second sampling rate is lower than the first sampling rate. As stated above apropos of claim 5, the combination of Williamson and Menkhoff meets all the elements of that claim. It would be a matter of choice to have a second frequency and second sampling rate lower than the first frequency and first sampling rate. Thus it would have been obvious to one of ordinary skill in the art at the time of the invention to second frequency and sampling rate lower than the first frequency and sampling rate as claimed for the benefit of achieving a specific desired design specification for sampling.

Claim 7 claims the system of claim 6, wherein the second sampling rate is lower than the first sampling rate by two raised to the number of octaves spacing between the first frequency and the second frequency. As stated above apropos of claim 6, the combination of Williamson and Menkhoff meets all elements of that claim. It would have been a matter of design choice to have second sampling lower than the first as claimed. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the sampling rate difference as claimed for the benefit of achieving a specific desired design specification for sampling.

Claim 8 claims the system of claim 7, wherein the sequence of digital filters is configured to process frequencies in a first octave at the first sampling rate. As stated above

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apropos of claim 7, the combination of Williamson and Menkhoff meets all elements of that claim. Lyon teaches of a series of linear filters. Menkhoff teaches of a time varying filter and so it would be obvious to have a difference in the sampling rate, and a design choice to have the sequence of filters configured to process frequencies as claimed. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to have a sequence of filters configured as claimed for the benefit of achieving a specific desired design specification for sampling.

Claim 9 claims the system of claim 8, wherein the sequence of digital filters is further configured to process frequencies in a second octave at the second sampling rate. As stated above apropos of claim 8, the combination of Williamson and Menkhoff meets all elements of that claim. Lyon teaches of a series of linear filters. Menkhoff teaches of a time varying filter and so it would be obvious to have a difference in the sampling rate, and a design choice to have the sequence of filters configured to process frequencies as claimed. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to have a sequence of filters configured as claimed for the benefit of achieving a specific desired design specification for sampling.

Claim 10 claims the system of claim 9, wherein each coefficient is represented by fewer than 13 bits. As stated above apropos of claim 9, the combination of Williamson and Menkhoff meets all elements of that claim. It is well known in the art the filters can be represented by bits and it is a matter of choice as to how many bits. Thus it would have been obvious to one of ordinary skill in the art at the time of the invention to represent each coefficient as claimed for the benefit of achieving a desired design specification.

Claim 11 claims the system of claim 10, wherein each coefficient is represented by 12 bits. As stated above apropos of claim 10, the combination of Williamson and Menkhoff meets all elements of that claim. It is well known in the art the filters can be represented by bits and it is a matter of choice as to how many bits. Thus it would have been obvious to one of ordinary skill in the art at the time of the invention to represent each coefficient as claimed for the benefit of achieving a desired design specification.

Claim 15 claims the system of claim 14, wherein the first filter is configured to sample the first frequency at a first sampling frequency and the second filter is configured to sample a second frequency at a second sampling frequency. As stated above apropos of claim 14, Williamson meets all elements of that claim. Menkhoff teaches of a filter combination for sampling rate conversion comprising a time varying filter. The time varying filter provides the capability of varying the sampling rate. Modifying Lyon's apparatus so that at least one filter is a time varying one reads on the claimed matter. Thus it would have been obvious to one of ordinary skill in the art at the time of the invention to include at least one time varying filter in Lyon's apparatus for the benefit of achieving spectral translation or sampling rate changes or conversions.

Claim 16 claims the system of claim 15, wherein the second frequency is lower than the first frequency, and the second sampling frequency is lower than the first sampling frequency by a ratio of the first frequency to the second frequency. As stated above apropos of claim 15, the combination of Williamson and Menkhoff meets all the elements of that claim. It would be a matter of choice to have a second frequency and second sampling rate lower than the first frequency and first sampling rate. Thus it would have been obvious to one of ordinary skill in

the art at the time of the invention to second frequency and sampling rate lower than the first frequency and sampling rate as claimed for the benefit of achieving a specific desired design specification for sampling.

Claim 17 claims the system of claim 14, wherein the filters are evenly grouped into at least a first and a second octave, the first filter being in the first octave and the second filter being in the second octave. As stated above apropos of claim 14, the combination of Williamson and Menkhoff meets all the elements of that claim. It would be a matter of choice to have the filters grouped as claimed and the first and second filter being in their corresponding octaves as claimed. Thus it would have been obvious to one of ordinary skill in the art at the time of the invention to group the filters as claimed for the benefit of achieving a specific desired design specification.

Claim 18 claims the system of claim 17 wherein the filters in the first octave are sampled at a first sampling frequency that is at least twice as high as a highest frequency processed by the first octave. As stated above apropos of claim 17, the combination of Williamson and Menkhoff meets all the elements of that claim. It would be a matter of choice to have filters sampled as claimed. Thus it would have been obvious to one of ordinary skill in the art at the time of the invention to have the filters sampled as claimed for the benefit of achieving a specific desired design specification for sampling.

Claim 19 claims the system of claim 18, wherein the second octave is one octave lower than the first octave, and the filters in the second octave are sampled at a second sampling rate that is half as high as the first sampling frequency. As stated above apropos of claim 17, the combination of Williamson and Menkhoff meets all the elements of that claim. It would be a

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matter of choice to have a second frequency and second sampling rate lower than the first frequency and first sampling rate. Thus it would have been obvious to one of ordinary skill in the art at the time of the invention to second frequency and sampling rate lower than the first frequency and sampling rate as claimed for the benefit of achieving a specific desired design specification for sampling.

Claim 20 claims the system of claim 19 wherein each filter in the first octave shares its coefficients with each filter in a corresponding position in the second octave. As stated above apropos of claim 19, the combination of Williamson and Menkhoff meets all the elements of that claim. Lyon teaches of the filters sharing coefficients since they are cascaded. It would be a matter of choice to have a second frequency and second sampling rate lower than the first frequency and first sampling rate. Thus it would have been obvious to one of ordinary skill in the art at the time of the invention to have each filter share its coefficients as claimed for the benefit of achieving a specific desired design specification.

7. **Claim 22** is rejected under 35 U.S.C. 103(a) as being unpatentable over Williamson et al. (U.S. Patent 5,027,410) in view of Malcolm (Lyon's Cochlear Model).

Regarding **claim 22**, Williamson discloses a system for processing audio signals (Figure 8; column 13, lines 32-53) comprising a sequence of digital filter configured to process sound similar to a cochlea (131-135, Figure 8) ; providing each filter with coefficients for processing its selected frequency such that a first filter configured to process a first frequency shares its coefficients with a second filter configured to process a second frequency that is progressively lower than the first frequency (column 13, line 33 -column 14, line 66) ; and applying the audio signal to the sequence of digital filters (Figure 8, column 13, lines 32-column 14, line 8). The

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claim language that recites wherein each frequency is processed over 10 octaves and each octave is processed by a filter group having 60 filters is a matter of design choice. Lyon's Cochlear Model discloses a model of the cochlear, using the Mathematica programming language, and using the same models as the applicant (See page 7, and 73). It is obvious therefore, that Lyon's apparatus (Figure) can be implemented using a program. The claimed steps are obvious in the functionality of Lyon's apparatus. Thus it would have been obvious to one of ordinary skill in the art at the time of the invention to have a computer program comprising the claimed steps for the benefit of having signal-processing apparatus that is more efficient.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.


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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Devona E. Faulk whose telephone number is 703-305-4359. The examiner can normally be reached on 8 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Forester W. Isen can be reached on 703-305-4386. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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SUPERVISORY PATENT EXAMINER